

REMARKS

This amendment responds to the office action mailed February 14, 2003. In the office action the Examiner:

- rejected claims 11-13, 20-22, and 29-31 under 35 U.S.C. 102(b) as anticipated by U.S. Patent No. 5,905,063 to Tanabe; rejected claims 20-22 and 29-31 under 35 U.S.C. 102(b) as anticipated by U.S. Patent No. 5,962,385 to Maruyama; rejected claims 11-13, 20-22, and 29-31 under 35 U.S.C. 102(b) as anticipated by U.S. Patent No. 5,972,862 to Torii et al; and rejected claims 11-13, 20-22, and 29-31 under 35 U.S.C. 102(b) as anticipated by U.S. Patent No. 6,235,693 to Cheng et al.

After entry of this amendment, the pending claims are: claims 11-13, 20-22, and 31-41.

PRIOR ART REJECTIONS

U.S. Patent No. 5,905,063 to Tanabe et al. discloses a remover solution for removing etch residues containing a salt of hydrogen fluoride combined with a water-soluble organic solvent, and water at a pH of 5 to 8. However, no mention is made of the use of ammonium hydrogen fluoride (or ammonium bifluoride), which provides greater stability than ammonium fluoride, or the use of a synergistic mixture of co-solvents or basic amine compounds with DMSO and a fluorinated compound.

U.S. Patent No. 5,972,862 to Torii et al. discloses a cleaner composition comprising a fluorine-containing compound, a water-soluble or water-miscible organic solvent; an inorganic acid and/or organic acid, and optionally a quaternary ammonium salt or organic carboxylic acid amine salt. The formulations disclosed in Torii require an organic acid or inorganic acid as specified in column 5, lines 22-38 and teaches away from formulations that do not include require such a component.

U.S. Patent No. 5,962,385 to Maruyama discloses a cleaner composition for removing etch and ash residues. Maruyama does not specify that the formulas therein are useful for removing photoresists or to etch silicon oxides. Furthermore, Maruyama teaches away from using any formulation that contains less than 72% organic solvent or more than 80% organic solvent (see, column 3, lines 15-20). Maruyama also fails to teach the use of the particular

co-solvents, basic amines, and chelating agents claimed in the present invention. The use of such chelating agents overcomes the deficiencies of Maruyama.

U.S. Patent No. 6,235,693 to Cheng et al. discloses lactam compositions for cleaning organic and plasma etched residues for semiconductor devices. The compositions also include a fluoride compound, a sulfoxide or glycol and water. Since the compositions require the presence of a lactam component, Cheng teaches away from cleaning formulations that do not require a lactam component.

The present claims have been amended to overcome the rejections set forth by the Examiner in the present office action. Independent claims 11 and 12 have been amended such that the composition includes a fluoride compound, water, an organic sulfoxide, a basic amine and a co-solvent selected from a list of co-solvents. It is recognized by Applicants in the present application that where the fluoride component is not ammonium hydrogen fluoride, one or more co-solvents or basic amine compounds are needed to prevent excess corrosion of substrate. See, page 8, lines 12-22. Accordingly, claims 11 and 12 have been amended to include both the preferred co-solvents and a basic amine component to minimize corrosion. The cited patents do not disclose the use of such formulations to minimize corrosion while removing either photoresist (claim 11) or etch residue (claim 12).

Independent claim 13, as well as independent claims 22 and 31, have been amended to reflect that such formulations are useful as a silicon etchant, which preferably contain about 20% to about 40% by weight of the fluoride component. The cited patents do not disclose formulations that contain more than 15% by weight of the fluoride component. Independent claims 20 and 21 specify that the fluoride component is ammonium hydrogen fluoride. The Applicants have recognized that ammonium hydrogen fluoride provides improved stability and is the least corrosive fluoride species to metals. See, page 8, lines 27-32 and Example 4. Therefore, Applicants have recognized that the use of ammonium hydrogen fluoride minimizes corrosion of metals compared to other fluoride compounds without the addition of basic amines or co-solvents. None of the cited patents even mention this understanding.

Claims 32-41 depend from the above-described independent claims. Since each independent claim is not anticipated by the cited art, then necessarily these claims that depend therefrom are not anticipated by such art.

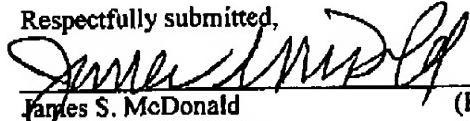
In light of the above amendments and remarks, the Applicant respectfully requests that the Examiner reconsider this application with a view towards allowance. The Examiner

is invited to call the undersigned attorney at 650-849-7631, if a telephone call could help resolve any remaining items.

Date:

July 24, 2003

Respectfully submitted,

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(Reg. No.)

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